ENVIRONMENTAL IMPACT ASSESSMENT

PROPOSED CONSTRUCTION AND IMPLEMENTATION OF A PHOTOVOLTAIC POWER PLANT ON THE REMAINDER OF THE FARM DYASONSKLIP 454, SOUTH WEST OF UPINGTON, NORTHERN CAPE

APPLICANT: RE CAPITAL 11 (PTY) LTD

REPORT:
AGRICULTURAL POTENTIAL STUDY
6 AUGUST 2014

STUDY CONDUCTED AND
REPORT COMPILED BY: C R LUBBE
**EXECUTIVE SUMMARY**

RE Capital 11 (Pty) Ltd, a renewable energy developer, proposes to construct a 75 MW photovoltaic power plant on the remainder of the farm Dyasonsclip 454 southwest of the town Upington in the Northern Cape.

The EIA is conducted for environmental authorisation and as part of this EIA; an agricultural potential study has been commissioned to scope possible impacts of the project on its immediate agricultural environment.

A desktop study and field investigation was conducted, including a soil augering survey and a veld condition assessment.

The site was found unsuitable for commercial cultivation due to limiting factors such as shallow soil depth and hard setting carbonate horizons below surface. The low clay percentage results in low water holding capacity and low nutrient availability. Severe climatic conditions further limit commercial cultivation.

The proposed project area could be utilized as grazing for cattle, but grazing capacity is low. Agricultural activities could continue normally in the surrounding areas.

The construction and operation of a PV Power Plant would have no high impacts on the agricultural potential of the identified site or the local region, except for increasing the possibility of erosion where soil is disturbed.
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1. **INTRODUCTION**

Cape Environmental Assessment Practitioners (Pty) Ltd is currently conducting an EIA for RE Capital 11 (Pty) Ltd to construct a solar power plant. The development site is on the remainder of the Farm Dyasonsklip 454, situated 20 km southwest of the town Upington in the Northern Cape.

The EIA is conducted for environmental authorisation under the National Environmental Management Act (Act 107 of 1998), as amended. As part of this EIA, an agricultural potential study has been commissioned to scope possible impacts of the project on its immediate agricultural environment.

This document reports on a study that focuses specifically on the potential impacts of the project on agriculture. The study was undertaken by CR Lubbe during July 2014. The scope and purpose of the study are described in detail below.

2. **OBJECTIVES**

The objectives of this study were to consider the possibility of temporary and permanent impacts on agricultural production that may result from the construction and operation of the PV Power Plant.

3. **APPROACH AND METHODOLOGY**

3.1. Desktop Study

A desktop study was conducted to review existing data and literature sources. The desktop review provided a baseline agricultural and land use profile, focusing on the specific geographical area potentially impacted by the proposed project.

3.2. Field Investigation

The site was visited and assessed for land use and agricultural potential. An augering survey was carried out and plotted and soil groups were indicated in uniform polygons.

Potential impacts of the proposed project on agriculture were identified and considered, with particular attention to the following aspects:

- The possibility of permanent loss of high potential agricultural land;
- Impairment of land capability due to construction;
- Veld conditions for grazing.
- Analysis of erosion risk because of altered drainage patterns and poor rehabilitation in erosion-sensitive areas.

4. **ASSUMPTIONS AND UNCERTAINTIES**

A study of this nature will inherently contain various assumptions and limitations.

As far as regional information is concerned, this is primarily a desktop-based study. Climatic conditions, land uses, land type and terrain are readily available from literature, GIS information and satellite imagery.

Notwithstanding these limitations, the site-specific field studies confirmed most of the desktop findings and I am confident that the findings provide sufficient detail for the agricultural potential study reported in this document.

5. **DESCRIPTION OF THE PROPOSED PROJECT**

RE Capital 11 (Pty) Ltd, a renewable energy developer, proposes to construct a 75 MW photovoltaic plant on the remainder of the farm, Dyasonsklip 454 with a total farm area of 5725.28ha.
The net generating capacity (AC) of the plant will be 75 MWp, with an installed capacity (DC) of ±86.25 MWp with fixed, single or double axis tracking technology.

The site being investigated covers an area of 510 ha, but the final footprint of the plant will be approximately 240 ha, including auxiliary buildings.

The facility will connect to the Oasis substation with a capacity of 132/11 kV.

Access roads are expected to be ±6 m wide, but the total length is unknown at this stage and depends on the final layout. The project will use existing access roads where possible. Certain access roads not needed during operation will be closed and rehabilitated after construction.

6. **THE POTENTIALLY AFFECTED ENVIRONMENT**

This section provides a general description of the immediate environment potentially affected by the construction, operation and closure of the proposed PV power plant.

6.1. **Locality**

The proposed Power Plant will be located on the remainder of the farm Dyasonsklip 454, situated west of the N14 and approximately 20 km southwest of Upington, in the Northern Cape (see **Figure 1**).

![Figure 1: Location of the proposed PV Power Station](image)

6.2. **Physical description of site**

The site is on the centre portion of the farm Dyasonsklip. The surrounding area has a mixed urban and agricultural character. West of the N14, the land is mostly used for sheep farming. East of the N14 the character change to urban and industrial settlement with intensive irrigated cultivation bordering the Gariep River.
6.2.1. **GEOLOGY**

The area lies in the Kalahari geological group in the Namaqualand metamorphic complex. This is the youngest of the geological groups formed in the past 65 million years.

The lithology (mineralogical composition and texture of rocks) of this area consists of sand and limestone.

- **Sand**

  During a very dry period in Southern Africa some 100 000 years ago sand was transported from the Namib desert by strong and continuous wind and distributed over the Kalahari.

- **Limestone**

  Limestone is a sedimentary rock consisting largely of calcium carbonate, which is usually derived from the shells of minute marine or fresh-water animals. Sand, clay and minerals such as magnesia or iron oxide are also present.

  Sedimentary and Volcanic rocks (parent material of soils) found in the area include Schist, Gneiss, Kinzigite and granite.

6.2.2. **CLIMATE**

The region is classified as an arid zone with desert climate. The following specific parameters are applicable:

<table>
<thead>
<tr>
<th>Rainfall</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Annual rainfall</td>
<td>0-200mm</td>
</tr>
<tr>
<td>Summer rainfall</td>
<td>&lt;62.5mm</td>
</tr>
<tr>
<td>Winter rainfall</td>
<td>&lt;62.5mm</td>
</tr>
<tr>
<td>Variation in rainfall</td>
<td>40 to 50%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temperature</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean maximum temperature</td>
<td>&gt;35°C</td>
</tr>
<tr>
<td>January Temperature</td>
<td>&gt;27.5°C</td>
</tr>
<tr>
<td>Mean minimum temperature</td>
<td>2.1 to -4°C</td>
</tr>
<tr>
<td>July temperature</td>
<td>&lt;7.5°C</td>
</tr>
<tr>
<td>Temperature range</td>
<td>&gt;15°C</td>
</tr>
<tr>
<td>First frost expected</td>
<td>21 to 31 May</td>
</tr>
<tr>
<td>Last frost expected</td>
<td>21 to 30 September</td>
</tr>
<tr>
<td>Hours of sunshine</td>
<td>&gt;80%</td>
</tr>
<tr>
<td>Evaporation</td>
<td>&gt;2400 mm</td>
</tr>
<tr>
<td>Humidity</td>
<td>&lt;30%</td>
</tr>
</tbody>
</table>

6.2.3. **SOILS**

Soils in this region usually show the following characteristics:

- Soils have minimal development, are usually shallow, on hard or weathering rock, with or without intermittent diverse soils.
- Lime is generally present in part or most of the landscape.
- Red and yellow well-drained sandy soil with high base status may occur.
- Freely drained, structure less soils may occur.
- Soils may have favourable physical properties.
- Soils may also have restricted depth, excessive drainage, high erodability and low natural fertility.

6.2.4. **VEGETATION**

The site is situated in the Nama Karoo Bushmanland region and in general, the vegetation is an open shrub land, dominated by small woody shrubs and white Bushman Grass, *Stipagrostis* species. Succulents occur in some areas.

Trees and bigger shrubs are mostly confined to rocky areas, but there are some woody plants on the plains, especially where the soils are shallow, along drainage lines or seasonal watercourses. On the flats, the *Rhigozum* species and *Rhus* species tend to be more common.

The grazing capacity is low at 31 to 35 hectares per large stock unit (LSU). The Normalised Difference Vegetation Index (NDVI) is low.¹

6.2.5. **TOPOGRAPHY**

The topography has low relief. The slope gradient is between 0 and 2% with a convex shape.

7. **STUDY FINDINGS**

The site was visited in early July 2014.

7.1. **Structures on site**

Structures on site include internal fencing, an earth dam, borehole, reservoir and solar borehole pump.

![Figure 2: Structures on site](image)

7.2. **Surrounding developments**

To the east of the site, the Abengoa Solar facility is under construction.

¹ NDVI refers to a mathematical formula applied to satellite imagery to provide information on plant activity or vigour. It is an indicator of active vegetation cover.
7.3. Past and Current Agricultural Activities on Site

The site is utilised for extensive cattle farming. There is no evidence of past or current cultivation.

7.4. Soil Classification

An augering survey was carried out as indicated in Figure 4. At each augering point, an observation record was completed. The soil observation records in Error! Reference source not found.1 are representative of the four soil forms found on the site. These are further described below each observation record.
Table 1: Soil Forms identified on Unit D

<table>
<thead>
<tr>
<th>OBS</th>
<th>COMMENT</th>
<th>LAT</th>
<th>SLOPE</th>
<th>GR AD</th>
<th>1</th>
<th>MOISTURE</th>
<th>L</th>
</tr>
</thead>
<tbody>
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<table>
<thead>
<tr>
<th>OBS</th>
<th>COMMENT</th>
<th>LAT</th>
<th>SLOPE</th>
<th>SHAPE</th>
<th>1</th>
<th>MOISTURE</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Coega (0-10 cm)

About 30% consists of the Coega form (Family Nabies)

0-10 cm Brown, sandy, (fine grade) with single grain structure top soil

40% stones in top soil

Hard pan Carbonate horizon limiting layer

Plooysburg >40cm

About 10% of the area is represented by the Plooysburg form (Family Brakkies)

0-20 cm red sandy (Very fine grade) single grain structured top soil

20-40 cm Red brown, loamy sand, (Very fine grade) structure less sub soil

Hardpan Carbonate horizon

Garies > 40cm

About 8% of the area is represented by the Plooysburg form (Family Nuwerus)

0-20 cm red sandy (Very fine grade) single grain structured top soil

20-40 cm Red, sandy, (Very fine grade) structure less sub soil

Dorbank

Hutton (0-10 cm)

About 15% consists of the Hutton form (Family Stella)

0-10 cm red, sandy, (fine grade) with single grain structure top soil

Limited by rock
Plooysburg <30cm

About 38% of the area is represented by the Plooysburg form (Family Brakkies)

0-15cm red sandy (Very fine grade) single grain structured top soil

10-15cm Red brown, loamy sand, (Very fine grade) structure less sub soil

Hardpan Carbonate horizon

The soils were then grouped in uniform utilization polygons, as illustrated in Figure 5.

![Figure 5: Soil Groups]

40 to 70cm deep red sandy soil limited by dorbank or hardpan carbonate

0 to 30cm deep red sandy soil limited by rock or hardpan carbonate

7.5. Veld Condition Assessment

A veld condition assessment was done simultaneous with the soil survey, by visual acknowledgement.

The object was to assess the veld in terms of

- Plant cover
- Most common types of grasses
- Soil surface condition
- Presence of invader plants

The cover is sparse with large bare areas, especially where hard carbonate surfaces occur. Moderate to severe erosion occur. The common grasses appearing on site include *Stipagrostis cilata* and *Stipagrostis obusta*. These are palatable and valuable grasses with high nutritional value and important sand binders. Its ecological status is a decreaser, meaning that the population declines when veld is overgrazed.
The three thorn (*Rhigozum trichtomum*), present on site, is an indigenous plant which gets invasive when veld is overgrazed, which is the case here.

The outcome of the veld condition assessment is shown in Table 2 and demonstrated by the photos in *Figure 6*. Error! Reference source not found.

**Table 2: Veld Condition Assessment outcome**

<table>
<thead>
<tr>
<th>ASSESSMENT CATEGORY</th>
<th>FINDING</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLANT COVER</td>
<td>Plant cover is very sparse with some bare areas</td>
<td>7</td>
</tr>
<tr>
<td>COMMON GRASSES</td>
<td>Moderate and poor grazing grasses mixed</td>
<td>7</td>
</tr>
<tr>
<td>SURFACE CONDITION</td>
<td>Moderate levels of top soil loss</td>
<td>3</td>
</tr>
<tr>
<td>BUSH ENCROACHMENT</td>
<td>Medium to light bush encroachment present</td>
<td>4</td>
</tr>
<tr>
<td>SOIL TYPE</td>
<td>Sandy soil</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>23</td>
</tr>
</tbody>
</table>

*Figure 6: Veld Conditions*
7.6. Land Capability and Suitability for agriculture

Land capability involves the consideration of

- the risk of land damage from erosion and other causes and
- the difficulties in land use owing to physical land characteristics, including climate.

The physical properties of the soil represent the worst scenarios used in criteria to depict class limits. This includes low clay percentage, shallow effective depth, low water holding capacity and severe climatic conditions.

In this case, land capability is classified as non-arable low potential grazing land. This is due to the arid climate and limiting soil properties.

The land capability and suitability for crop production is shown in Error! Reference source not found. while capability and suitability for grazing is set out in Error! Reference source not found.

<table>
<thead>
<tr>
<th>Land capability class</th>
<th>Suitability Rating</th>
<th>Major Limitation to Crop Production</th>
<th>Area (ha)</th>
<th>% of Local Study Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class VI Hu &lt;30cm</td>
<td>Very low</td>
<td>Low water holding capacity</td>
<td>420</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shallow rooting zone</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Severe climate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Severe erosion hazard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class IV Py &gt;40cm</td>
<td>Low</td>
<td>Low water holding capacity</td>
<td>90</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Severe climate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Area Description</th>
<th>Suitability Rating</th>
<th>Major Limitation to Grazing</th>
<th>Area (ha)</th>
<th>% of Local Study Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>Low</td>
<td>Very shallow rooting depth</td>
<td>510</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>low clay content, low rainfall, with a carrying capacity of 16-25ha /LSU</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.7. Water Availability/Provision

Water is provided to livestock from a borehole pumped by solar powered pump and stored in reservoir and troughs.

7.8. Erosion potential

In this arid climate the erosivity (The potential ability of rain to cause erosion) is low but the erodability (vulnerability of the soil to erosion), is high due to the low clay percentage and shallow soil depth.

Possible erosion caused by water is low, due to the characteristics of the terrain – see Figure 7.

- Regular slope of 1.6%.
- Length of slope is short
- Small catchment area, because water drain naturally away from the ridge.
The risk of erosion caused by wind is high due to the low clay percentage of the soil and the fact that the soil is usually dry - therefore prone to blow away. To combat this erosion, vegetation is needed, but the severe climatic conditions prevent possible mechanical conservation measures. However, this erosion risk already exists and proposed Power Plant will not increase the risk. Furthermore, the cover provided by the sun panels may reduce the wind impact.

7.9. Summary of findings

The site is largely unsuitable for cultivation due to the following limiting factors:

- Low annual rainfall, high evaporation and extreme temperatures restrict dry land cultivation.
- The very shallow soil depth with its limited water holding capacity restricts root development.
- The soils have carbonate-rich B-horizons. The use of Calcic soils is limited by climate (low rainfall and high evaporation), shallow soil depth, high pH, low plant available P and trace elements (especially Fe), toxic levels of extractable B and stoniness. All calcic soils are highly susceptible to water erosion.
- The very fine sand grade of top soil influences the stability and increases erodability potential.
- Low clay percentage results in low water holding capacity and low nutrient availability, resulting in low soil fertility.

The area could be utilised as grazing, but it should be noted that the grazing potential is very low.

8. POSSIBLE IMPACTS

Only three possible impacts were identified and considered:

8.1. Loss of high potential cultivation land

Due to the low agricultural potential for cultivation as discussed in paragraph 7.9, loss of cultivation land is non-existent.

8.2. Loss of grazing for cattle farming

Due to the low grazing capacity (16-25 ha/LSU) the loss of grazing land is negligible.
8.3. **Erosion caused by changing drainage lines during construction**

Due to low rainfall and the intention of the applicant to rehabilitate disturbed areas and construct storm water drains, the possible impact of erosion is very low.

9. **CONCLUSION**

The findings of this study indicate that the site’s agricultural potential is low. Due to poor soil properties and extreme climatic conditions, farming activities consist of grazing for cattle, but due to the low grazing potential of the region, the loss of the small area of grazing land is negligible.

The proposed power plant will have a very small impact on agriculture, locally and on site, and will have no influence on the current commercial farming in the region.

C R LUBBE  
AGRICULTURAL SPECIALIST  

6 August 2014
LIMITATIONS

This Document has been provided subject to the following limitations:

(i) This Document has been prepared for the particular purpose outlined in the proposal and no responsibility is accepted for the use of this Document in other contexts or for any other purpose.

(ii) CR Lubbe did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document.

(iii) Conditions may exist which were undetectable given the limited nature of the enquiry CR Lubbe was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.

(iv) It is recognised that the passage of time affects the information and assessment provided in this Document. CR Lubbe’s opinions are based upon information that existed at the time of the production of the Document. CR Lubbe’s opinion rests on the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site.

(v) Any assessments made in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, express or implied, that the actual conditions will conform exactly to the assessments contained in this Document.

(vi) Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted for incomplete or inaccurate data supplied by others.

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REFERENCES


Thomas V, Moll E and Grant R., 2008. Sappi Tree Spotting: Cape –From Coast to Kalahari. Jacana, Johannesburg

APPENDIX A

ENVIRONMENTAL PRACTITIONER CURRICULUM VITAE

Christiaan Rudolf Lubbe

KEY QUALIFICATIONS:
National Higher Diploma in Agriculture (Irrigation), Technikon Pretoria, 1982
Certificate in Stereoscopic Interpretation, Geology and Resource Classification and Utilisation, Department of Agriculture, 1979
National Diploma in Agriculture, Technikon Pretoria, 1976

OTHER EDUCATION:
Certificate in Landscape Management, Technikon Pretoria, 1988
Cultivated pastures (Mod 320), University of Pretoria, 1995
FSC Auditors Course (Woodmark, UK), Sappi Ltd, 2003
NOSA Health and Safety Certificate, 1996
Certificate of Competence: Civil Designer - Design Centre and Survey and Design (Knowledge Base, August 2005)

EMPLOYMENT RECORD:
July 2006 to date
CR LUBBE
Self employed
Involved in various projects (see project related experience).

June 2004 - June 2006
Gauteng Department of Agriculture Conservation and Environment
Component: Technology Development and Support
Johannesburg, SA
Acting Assistant Director: Resource Planning and Utilization

Jan 1997 – May 2004
CR LUBBE
Self employed
Involved in various projects (see Project related experience below)

1980 to 1996
Technikon Pretoria
Pretoria, SA
Lecturer
Teaching Agricultural Engineering and Land Use Planning subjects. Teaching included practical courses, examination and moderation

1974 - 1979
Department of Agriculture (Transvaal Region)
Carolina and Ermelo, SA
Senior Extension Technician
Farm Planning, Surveying, Design of soil conservation systems, Agricultural Extension.

SUMMARY OF EXPERIENCE

Has 40 years of experience in planning and managing natural resources to ensure optimal utilisation, without exploiting such resources to the detriment of future generations.

Fourteen years experience as a soil consultant, doing mainly soil surveys, terrain classification and agricultural potential studies. Reports include a variety of maps and GIS aspects thus play a large role in these surveys and studies.

Seventeen years of lecturing agricultural engineering subjects: Soil Conservation Techniques I, II and III, which dealt with the surveying, design and drawing of soil conservation structures; Farm Planning, which dealt with optimal resource utilization and Agricultural Mechanization, which dealt with the implements and machinery used to mechanize farming.

Ten years experience in the survey, design and supervising the construction of soil conservation structures in the agricultural field, mainly for farm planning.

PROJECT RELATED EXPERIENCE

PROJECTS UNDERTAKEN IN INDIVIDUAL CAPACITY

Cape EA
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Upington in the Northern Cape.

Cape EA
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station near Danielskull in the Northern Cape.

Senter360
Agricultural Potential Study for a Food Security Development Units in the Democratic Republic of the Congo.
<table>
<thead>
<tr>
<th>Project Title</th>
<th>Date</th>
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<tr>
<td>Agricultural Impact Assessment for the Construction and Operation of a Beef Cattle Handlings Facility for a Sugar Company in Northern Sudan</td>
<td>Aug 2012</td>
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<tr>
<td>Van Zyl Environmental Consultants: EIA for the Construction and Operation of a Photovoltaic Power Station in the Northern Cape.</td>
<td>Mar 2012</td>
</tr>
<tr>
<td>Design and cost estimate of a stock watering system in the Lephalale district.</td>
<td>Nov 2011</td>
</tr>
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<td>Soil suitability survey for two new upcoming farmers at Vhuawela &amp; Tshoga in the Limpopo Province.</td>
<td>Sep 2011</td>
</tr>
<tr>
<td>Soil survey investigating soil potential for change of land use at the Levendal Development in the Paarl district, Western Cape.</td>
<td>Aug 2011</td>
</tr>
<tr>
<td>Potential assessments and land use plans for four new upcoming farmers in the Limpopo Province.</td>
<td>Nov 2010</td>
</tr>
<tr>
<td>Potential assessments and land use plans for various new Limpopo agricultural development hubs</td>
<td>Apr 2010</td>
</tr>
<tr>
<td>Potential assessments and land use plans for the resettlement of land tenants at Mafube Coal Mine in the Belfast district of the Mpumalanga Province</td>
<td>May 2009 – Apr 2010</td>
</tr>
<tr>
<td>Undertook reconnaissance soil surveys on various plantations and farms in the Vryheid and Piet Retief districts to establish forestation potential and evaluation for species choice (covering a total area of 5173 ha).</td>
<td>Vryheid, RSA</td>
</tr>
<tr>
<td>Undertook soil and terrain classification surveys on the Jessievale (8313 ha) and New Agatha (1 700 ha) plantations.</td>
<td>Nelspruit, RSA</td>
</tr>
<tr>
<td>Undertook environmental, soil and terrain classification surveys on the Thatevondo (4 500 ha), Mafela (920 ha) and Mmamatola (1 263 ha) plantations.</td>
<td>Limpopo Province</td>
</tr>
<tr>
<td>Undertook soil and terrain classification surveys on Ranch Lope and Ranch Suba in Gabon, Kubuta Farm in Swaziland and on the farms Madikwe in the Limpopo Province and Stoffelsrus in the Free State, South Africa.</td>
<td>Gabon, Swaziland &amp; RSA</td>
</tr>
<tr>
<td>Assess comparative soils and area for relocating Village Ga-Sekhaolelo on Overysel 815LR to Rooibokfontein 812LR and Village Ga-Puka on Swartfontein 818 LR to Armoed on Potgietersrus Platinum Mine.</td>
<td>Potgietersrus, RSA</td>
</tr>
<tr>
<td>GPS survey and alien identification for mapping of Jukskei and Swartspruit areas, as part of the Working for Water Program.</td>
<td>Gauteng</td>
</tr>
<tr>
<td>Participated in a due diligence audit on various SAFCOL plantations in the Limpopo and Mpumalanga Provinces as part of the preparation of a British company’s tender to purchase these plantations.</td>
<td>Limpopo and Mpumalanga</td>
</tr>
<tr>
<td>Survey to provide a detailed inventory of the forest resources in 17 specified Forest Reserves in Ghana to develop a practical and operationally sound methodology for monitoring the natural forest resources in Ghana, based on satellite imagery for the Ghana Forestry Commission.</td>
<td>Ghana</td>
</tr>
<tr>
<td>Various Soil Surveys and Landuse Plannings – Domestic and Neighbouring Countries</td>
<td>Pretoria</td>
</tr>
<tr>
<td>Various Soil Surveys and Landuse Plannings</td>
<td>Pretoria</td>
</tr>
<tr>
<td>Lectures at Basic Farm Planning Course (Limpopo and Gauteng)</td>
<td>Modimolle</td>
</tr>
</tbody>
</table>
DECLARATION OF INDEPENDENCE

CR Lubbe was appointed by RE Capital 10 (Pty) Ltd via Cape Environmental Assessment Practitioners (Pty) Ltd, the EAP, to conduct an independent agricultural potential study for the proposed PV Power Plant in the Northern Cape.

He is not a subsidiary or in any way affiliated to RE Capital 10 (Pty) Ltd.

CR Lubbe also does not have any interest in secondary developments that may arise from the authorisation of the proposed project.

Christo Lubbe

CR Lubbe

6 August 2014